

**What is claimed is:**

1. A potentiometric sensor comprising:

<sup>18</sup>  
a tube, said tube having an end, an interior and an exterior;

<sup>12</sup>  
a cap member disposed on said end of said tube so as to close said end of said tube, said cap member having an interior surface exposed to the interior of said tube and an exterior surface, said cap member comprising yttria-stabilized zirconia;

a first electrode disposed on said interior surface of said cap member, said electrode covered by a layer comprising a zeolite; and

a second electrode disposed on said exterior surface of said cap member.

2. A potentiometric sensor according to claim 1 additionally comprising a source of electrical potential supplied to said first and second electrodes, and a potentiometer in electrical contact with said source of electrical potential.

3. A potentiometric sensor according to claim 1 wherein said tube comprises alumina.

4. A potentiometric sensor according to claim 1 wherein said first electrode comprises a material selected from the group consisting of platinum, gold and  $\text{Cr}_2\text{O}_3$ .

5. A potentiometric sensor according to claim 1 wherein said second electrode comprises a material selected from the group consisting of platinum, gold and  $\text{Cr}_2\text{O}_3$ .

6. A potentiometric sensor according to claim 1 wherein said zeolite is zeolite Y.



7. A potentiometric sensor comprising:

a tube comprising yttria-stabilized zirconia, said tube having an exterior surface and an interior surface;

a first electrode disposed on said exterior surface of said tube;

a second electrode disposed on said interior surface of said tube; and

a zeolite material covering at least one of said electrodes.

8. A potentiometric sensor according to claim 7 additionally comprising a source of an electrical potential supplied to said first and said second electrodes disposed on said tube, and a potentiometer in electrical contact with said source of an electrical potential.

9. A potentiometric sensor according to claim 7 wherein said first electrode comprises a material selected from the group consisting of platinum, gold and  $\text{Cr}_2\text{O}_3$ .

10. A potentiometric sensor according to claim 7 wherein said second electrode comprises a material selected from the group consisting of platinum, gold and  $\text{Cr}_2\text{O}_3$ .

11. A potentiometric sensor according to claim 7 wherein said zeolite is zeolite Y.

12. A potentiometric sensor comprising:

a substrate comprising yttria-stabilized zirconia;

a first electrode disposed on said substrate; and



a second electrode disposed on said substrate and having a layer comprising a zeolite disposed thereupon.

13. A potentiometric sensor according to claim 12 additionally comprising a source of electrical potential supplied to said electrodes, and a potentiometer in electrical contact with said source of electrical potential.

14. A potentiometric sensor according to claim 12 wherein said first electrode comprises a material selected from the group consisting of platinum, gold and  $\text{Cr}_2\text{O}_3$ .

15. A potentiometric sensor according to claim 12 wherein said second electrode comprises a material selected from the group consisting of platinum, gold and  $\text{Cr}_2\text{O}_3$ .

16. A potentiometric sensor according to claim 12 wherein said zeolite is zeolite Y.

17. A potentiometric sensor according to claim 12 wherein said substrate, said first electrode and said second electrode are shielded from direct contact by an exhaust gas by a porous member that permits said exhaust gas to travel through said porous member such that said exhaust gas indirectly contacts said first and said second electrodes, said porous member additionally protecting said substrate, said first and said second electrodes from degradation caused by said exhaust gas.